



# NOTES

## GASTROINTESTINAL INFECTIONS

### GENERALLY, WHAT ARE THEY?

#### **PATHOLOGY & CAUSES**

- Gastrointestinal tract (GIT) inflammation caused by virus, bacteria, other parasites
- GIT mucosa inflammation → ulceration → epithelial disruption → edema, bleeding → fluid, electrolyte loss (diarrhea) → dehydration, electrolyte imbalance, anemia (bloody diarrhea)
- Mainly fecal-oral transmission

#### **RISK FACTORS**

- Living/traveling to endemic areas, youth, immunosuppression (e.g. corticosteroid treatment, HIV co-infection), malnutrition, poor hygiene

#### **SIGNS & SYMPTOMS**

- Fever, diarrhea, abdominal pain (cramps)
- Dehydration
  - Sunken eyes, dry mouth, decreased urination, dark yellow urine (deep amber—severe), dry skin, syncope

#### **DIAGNOSIS**

- Pathogen-dependent

#### **LAB RESULTS**

- Stool culture

#### **TREATMENT**

- Rehydration
- Antimicrobial therapy (pathogen-dependent)

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# CRYPTOSPORIDIUM

osms.it/cryptosporidium

## PATHOLOGY & CAUSES

- **Cryptosporidiosis:** diarrheal disease caused by *Cryptosporidium* (intestinal intracellular protozoan parasite)
- Life-cycle can be completed in one host
  - **Immunocompetent hosts:** self-limited diarrhea
  - **Immunocompromised hosts:** life-threatening complications

## CAUSES

- *Cryptosporidium* **oocysts** (infective form) transmitted via fecal → oral route
  - Infected individual/animal feces contaminates food; drinking, swimming water → fecally-contaminated food/water ingestion
- Parasites → intestinal epithelial inflammation → villi structure distortion → ↓ absorption, ↑ secretion → watery diarrhea
  - Sclerosing cholangitis/acalculous cholecystitis, respiratory cryptosporidiosis, pancreatitis

## RISK FACTORS

- Endemic-area exposure (tropical countries, Kuwait), immune deficiencies, poor hygiene
- **Interpersonal transmission:** sexual partners, daycare centers, household members

## COMPLICATIONS

- Dehydration, fluid and electrolyte imbalance

## SIGNS & SYMPTOMS

- Host's immune status-dependant

## DIAGNOSIS

### LAB RESULTS

#### Microscopic oocyte identification

- Stool; bile secretion, affected GIT aspirates; affected GIT tissue biopsy; respiratory secretion

#### Polymerase chain reaction (PCR)

- More sensitive, specific
- Differentiates between *Cryptosporidium* genotypes

#### Monoclonal antibodies and enzyme immunoassays (EIA)

- Monoclonal antibody test against oocyst wall
- More sensitive, specific than light microscope

## TREATMENT

### MEDICATIONS

- **Immunocompetent host:** antidiarrheal, antimicrobial agents
- **Immunocompromised host:** antiretroviral therapy (HIV-infected individuals), antimicrobial agents, azithromycin (severe diarrhea)

### OTHER INTERVENTIONS

- **Immunocompetent host:** oral/IV fluid/electrolyte-loss replacement

## CRYPTOSPORIDIOSIS SIGNS & SYMPTOMS

| IMMUNOCOMPETENT HOSTS           | IMMUNOCOMPROMISED HOSTS                                          |
|---------------------------------|------------------------------------------------------------------|
| Watery diarrhea (5-10 days)     | Bloody diarrhea (> 10 days)                                      |
| Abdominal pain (cramps)         | Right upper-quadrant abdominal pain (cholecystitis, cholangitis) |
| Low-grade/absent fever          | Fever                                                            |
| Usually no respiratory symptoms | Respiratory symptoms (dyspnea, cough, wheezing, etc.)            |



**Figure 74.1** Cryptosporidium organisms lining the crypt epithelium in an infected individual.

# ENTAMOEBIA HISTOLYTICA (AMOEBIASIS)

osms.it/entamoeba-histolytica

## **PATHOLOGY & CAUSES**

- Amebiasis
  - Caused by *Entamoeba histolytica* (anaerobic parasitic protozoan)
- Trophozoites bind to intestinal epithelial cells in colon, release lytic enzymes (e.g. cysteine proteinases) → epithelial cell lysis → trophozoites lyse inflamed/attracted immune cells → immune cell's lytic enzymes ↑ release
  - Intestinal mucosa ulcers → colitis → bowel necrosis → perforation → sepsis
  - Tissue destruction → mucosa blood vessel injury, malabsorption, ↑ intestinal secretion → bloody diarrhea, amebic dysentery
  - Blood vessel injury → trophozoites in blood stream → extraintestinal amebiasis (liver, pulmonary, cardiac, brain)

## **RISK FACTORS**

- Endemic-area exposure (Africa, Southern Asia, Central America)
- Intimate partner transmission possible
- Youth
- Malnutrition
- Immunodeficiency (e.g. malignancy, corticosteroid treatment, HIV)
- Poor hygiene

## **COMPLICATIONS**

- Amebic liver abscess rupture
  - Pericarditis, peritonitis
- Toxic megacolon
- Cerebral amebiasis → brain abscess → ↑ intracranial pressure
- Cutaneous amebiasis
- Dehydration

## **SIGNS & SYMPTOMS**

- Mostly asymptomatic; bloody diarrhea, mucus in stool (severe dysentery); abdominal pain; fever; weight loss; right upper-quadrant pain, jaundice (liver); cough (pulmonary); dehydration

## **DIAGNOSIS**

### **DIAGNOSTIC IMAGING**

#### **X-ray**

- Liver

#### **CT scan, MRI, ultrasound**

- Cystic intrahepatic cavity detection

### **LAB RESULTS**

#### **Microscopic identification**

- Cysts/trophozoites in stool/pus (e.g. liver abscess)

#### **Antigen detection**

- Enzyme-linked immunosorbent assay (ELISA), radioimmunoassay, immunofluorescence

#### **PCR**

- *Entamoeba* DNA detection

#### **Serology**

- *Entamoeba* antibodies detection

#### **Sigmoidoscopy/colonoscopy**

- Histological examination biopsies

## TREATMENT

### MEDICATIONS

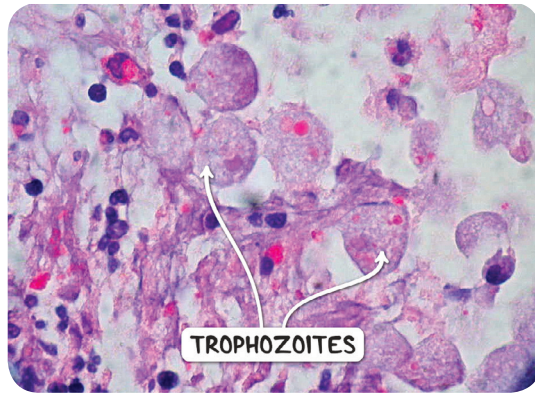
- Antibacterial agents
  - Invasive amoebic colitis
- Luminal agents
  - Intraluminal cysts, trophozoites
- Metronidazole
  - Amebic liver abscess  $\leq 10\text{cm}/3.94\text{in}$
- Broad-spectrum antibiotics
  - Suspected perforation, bacterial superinfection

### SURGERY

- Massive GIT bleeding
- Amebic liver abscess  $> 10\text{ cm}/3.94\text{ in}$
- Ruptured amebic liver abscess
- Perforated amebic colitis
- Toxic megacolon

### OTHER INTERVENTIONS

- Rehydration



**Figure 74.2** Trophozoites of *Entamoeba histolytica* in a colonic biopsy. The trophozoites have ingested red blood cells.

# GIARDIA LAMBLIA

[osms.it/giardia-lambliia](https://osms.it/giardia-lambliia)

## PATHOLOGY & CAUSES

- Giardiasis
  - Diarrheal disease caused by *Giardia intestinalis*/*Giardia duodenalis* (flagellated protozoan parasite, colonizes small intestine)
- Pathogenesis not well understood
- Infection causes microvilli shortening → intestinal malabsorption, hypersecretion → diarrhea

## CAUSES

- Contaminated/untreated water ingestion
- Contaminated food (uncommon)

## RISK FACTORS

- Endemic-area exposure (tropical countries), immunosuppression, comorbidities (e.g. cystic fibrosis), poor sanitation

## COMPLICATIONS

- Weight loss; dehydration; zinc, disaccharidase deficiency; malabsorption syndrome (adult); growth delay (children)

## SIGNS & SYMPTOMS

- Usually asymptomatic

### Acute giardiasis

- 7–14 days after infection exposure
- Diarrhea, malaise, abdominal pain, flatulence, nausea/vomiting, malodorous stool, steatorrhea, fever (uncommon)

### Chronic giardiasis

- > 18 days after infection exposure
- Loose stools (not typical diarrhea), profound weight loss (occasionally), abdominal pain, borborygmus (moving gas/fluid → GIT gurgling sound), flatulence, burping, malaise, fatigue, depression

## DIAGNOSIS

### LAB RESULTS

#### Antigen detection assays

- Trophozoite antigen (stool) detection

#### Nucleic acid amplification assays (NAAT)

- Giardia DNA detection

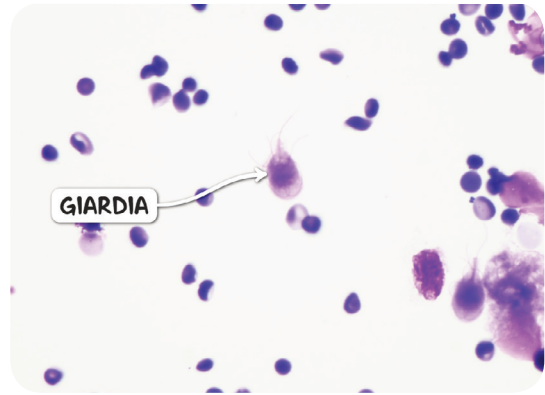
#### Stool microscopy

- Giardia cyst detection

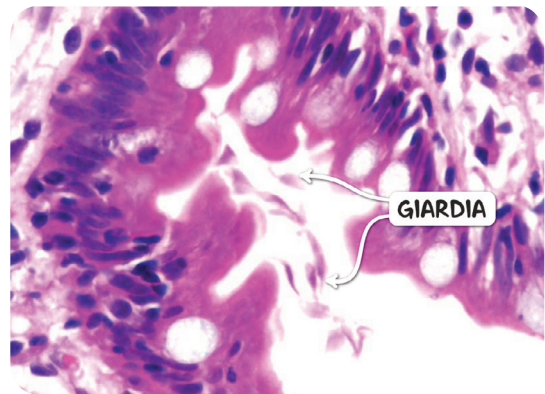
## TREATMENT

### MEDICATIONS

- Antimicrobial therapy
  - Paromomycin (pregnant/lactating individuals)



**Figure 74.3** Giardia lamblia in a cytology specimen.



**Figure 74.4** A duodenal biopsy demonstrating giardia organisms in the duodenal crypt.